Curriculum Vitae of Kishwar Ahmed

Contact Information

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Research Interests

My research interests span high-performance computing and quantum computing systems. More specifically, my research interests include modeling and simulation, parallel computing, interconnection network and energy-efficiency.

Teaching Interests

Parallel Computing, Modeling and Simulation, Computer Networks, Computer Architecture and Design, Programming Languages, Data Structure, Design and Analysis of Algorithms.

Education

Ph.D. in Computer Science **April 2018**
Florida International University, Miami, FL, USA
Thesis: Energy Demand Response for High-Performance Computing Systems
Supervisor: Prof. Jason Liu

M. Sc. in Computer Science **April 2017**
Florida International University (FIU), Miami, FL, USA
CGPA: 3.77/4.00

B. Sc. in Computer Science and Engineering **October 2009**
Bangladesh University of Engineering & Technology (BUET), Dhaka, Bangladesh
CGPA: 3.67/4.00
Rank: 13^{th} in a class of 125
Thesis: Techniques for Finding Network Building Blocks in Biological Networks
Supervisor: Prof. Saidur Rahman, Dept of CSE, BUET

Work Experience

Lecturer **June 2018 - present**
Florida International University, Miami, FL, USA

- Teaching undergraduate-level courses, such as Data Communications and Net-centric Computing.

Graduate Research Assistant **August 2017 - April 2018**
Florida International University, Miami, FL, USA

- Developed performance prediction tool for HPC applications. Proposed novel algorithms for energy-efficiency in HPC systems. Leveraged machine learning techniques to predict power and performance of HPC applications.

Research Aide **May 2017 - July 2017**
Argonne National Laboratory, Lemont, IL, USA

- Developed an energy-efficient demand response participation model for HPC system that can reduce approximately 20% energy consumption.

Graduate Teaching Assistant **August 2012 - April 2017**
Florida International University, Miami, FL, USA

- Conducted lab and supervised projects for undergraduate and graduate-level courses, such as Programming I Lab, Programming II, Introduction to Microcomputers Lab, Computer Data Analysis Lab, Operating Systems.

Lecturer **May 2010 - August 2012**
University of Information Technology & Sciences, Dhaka, Bangladesh

- Taught a number of courses, including Database Management Systems, Algorithms, Structured Programming Language, Computer Programming, Computer Fundamentals & Web Technology.

Software Engineer **December 2009 - April 2010**
aamra solutions limited, Dhaka, Bangladesh

- Developed a network-aware middleware for financial transaction switches to seamlessly integrate various point-of-sales terminals.

Awards and Honors

Travel Grant, NSF CSR Aspiring Investigators Workshop **2019**
Faculty Travel Grant, NSF MERIF Education Workshop **2019**
Outstanding Graduate Student, FIU SCIS **2018**

Student Volunteer, IEEE/ACM Supercomputing Conference (SC) **2017**
Student Travel Grant, IEEE/ACM Supercomputing Conference (SC) **2017**
Student Travel Grant, ACM SIGSIM Winter Simulation Conference (WSC) **2017**
The University of Chicago Travel Grant, Chameleon User Meeting **2017**
Top proposal abstract, Chameleon User Meeting **2017**
NCAR Travel Grant, Software Engineering Assembly Conference **2016**
Dean's Merit List Award, BUET **2008**

Publications

Book Chapter

1. **Kishwar Ahmed**, Shaolei Ren, Yuxiong He, and Athanasios V. Vasilakos, "Online Resource Management for Carbon-Neutral Cloud Computing," Handbook of Data Centers, Edited by Samee U. Khan and Albert Y. Zomaya, March 2015.

Refereed Journal Paper

2. Mohammad A. Islam, **Kishwar Ahmed**, Hong Xu, Nguyen H. Tran, Gang Quan, Shaolei Ren, "Exploiting Spatio-Temporal Diversity for Water Saving in Geo-Distributed Data Centers," IEEE Transactions on Cloud Computing, February 2016. (**Impact factor: 7.93**)

Refereed Conference Papers

3. **Kishwar Ahmed**, and Jason Liu, "Simulation of Energy-Efficient Demand Response for High Performance Computing System," in Proceedings of the 2019 Winter Simulation Conference (**WSC 2019**). To appear.

4. **Kishwar Ahmed**, Jesse Bull, and Jason Liu, "Contract-Based Demand Response Model for High Performance Computing Systems," in Proceedings of the 16^{th} IEEE International Symposium on Parallel and Distributed Processing with Applications (**ISPA 2018**), Melbourne, Australia, December 2018. To appear.

5. **Kishwar Ahmed**, Jason Liu, and Kazutomo Yoshii, "Enabling Demand Response for HPC Systems Through Power Capping and Node Scaling," in Proceedings of the 20^{th} IEEE International Conference on High Performance Computing and Communications (**HPCC 2018**), Exeter, UK, June 2018.

6. **Kishwar Ahmed**, Jason Liu, Abdel-Hameed Badawy, and Stephan Eidenbenz, "A Brief History of HPC Simulation and Future Challenges," in Proceedings of the 2017 Winter Simulation Conference (**WSC 2017**), Las Vegas, NV, December 2017.

7. **Kishwar Ahmed**, Jason Liu, and Xingfu Wu, "An Energy Efficient Demand-Response Model for High Performance Computing Systems," in Proceedings of the 25^{th} IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (**MASCOTS 2017**), Banff, AB, Canada, September 2017. (**Acceptance rate: 23.8%**)

8. **Kishwar Ahmed**, Jason Liu, Stephan Eidenbenz, and Joe Zerr, "Scalable Interconnection Network Models for Rapid Performance Prediction of HPC Applications," in Proceedings of the 18^{th} IEEE International Conference on High Performance Computing and Communications (**HPCC 2016**), Sydney, Australia, December 2016.

9. **Kishwar Ahmed**, Mohammad Obaida, Jason Liu, Stephan Eidenbenz, Nandakishore Santhi, and Guillaume Chapuis, "An Integrated Interconnection Network Model for Large-Scale Performance Prediction," in Proceedings of the 2016 ACM SIGSIM Conference on Principles of Advanced Discrete Simulation (**SIGSIM-PADS 2016**), Banff, AB, Canada, May 2016.

10. **Kishwar Ahmed**, Mohammad A. Islam, and Shaolei Ren, "A Contract Design Approach for Colocation Data Center Demand Response," In Proceedings of the 34^{th} IEEE/ACM International Conference on Computer-Aided Design (**ICCAD 2015**), Austin, TX, November 2015. (**Acceptance rate: 24.6%**)

11. Mohammad A. Islam, **Kishwar Ahmed**, Shaolei Ren, and Gang Quan, "Exploiting Temporal Diversity of Water Efficiency to Make Data Center Less "Thirsty"," In Proceedings of the 11^{th} USENIX International Conference on Autonomic Computing (**ICAC 2014**), Philadelphia, PA, June 2014. (**Acceptance rate: 20.3%**)

12. Samia Tasnim, Mohammad Ataur Rahman Chowdhury, **Kishwar Ahmed**, Niki Pissinou, and S. S. Iyengar, "Location Aware Code Offloading on Mobile Cloud with QoS Constraint," In Proceedings of the 11^{th} Annual IEEE Consumer Communications & Networking Conference (**CCNC 2014**), Las Vegas, NV, January 2014.

13. **Kishwar Ahmed**, Shaolei Ren, Vance Turnewitsch, and Athanasios V. Vasilakos, "Online Credibility Optimization and Power Control for Secure Mobile Crowdsourcing," In Proceedings of the 51^{st} Annual Allerton Conference on Communications, Control and Computing (**Allerton 2013**), Monticello, IL, October 2013.

Workshop Papers and Posters

14. **Kishwar Ahmed**, and Jason Liu, "Energy Demand Response Modeling for High Performance Computing Systems," Workshop on Modeling & Simulation of Systems and Applications (**ModSim 2018**), Seattle, WA, August 2018.

15. Samia Tasnim, **Kishwar Ahmed**, Niki Pissinou, and S. S. Iyengar, "Offloading Code Efficiently on Mobile Cloud," Poster in Grace Hopper Celebration of Women in Computing (**GHC 2015**), Houston, TX, October 2015.

16. **Kishwar Ahmed**, Mohammad A. Islam, Shaolei Ren, and Gang Quan, "Can Data Center Become Water Self-Sufficient?," in 6^{th} Usenix Workshop on Power-Aware Computing and Systems (**HotPower 2014**) held with **USENIX OSDI 2014**, Broomfield, CO, October 2014. (**Acceptance rate: 34%**)

Talks and Presentations

1. *Energy Demand Response Modeling for High Performance Computing Systems*, presented at Workshop on Modeling & Simulation of Systems and Applications (ModSim 2018), Seattle, WA, August 14-17, 2018.

2. *Interconnection Network Models for Large-Scale Performance Prediction*, presented at 4^{th} Summer of CODES workshop, Argonne National Laboratory, Lemont, IL, July 17-18, 2018.

3. *A Brief History of HPC Simulation and Future Challenges.* Conference talk at Winter Simulation Conference (WSC 2017), Las Vegas, NV, December 3-6, 2017.

4. *How to Enable HPC System Demand Response: An Experimental Study*, presented at Chameleon User Meeting 2017, Argonne National Laboratory, Lemont, IL, September 13-14, 2017.

5. *A Power Capping Approach for HPC System Demand Response*, presented at CS Seminar, Argonne National Laboratory, Lemont, IL, July 27, 2017.

6. *Enabling Demand Response Participation for HPC Systems*, presented at 3^{rd} Summer of CODES workshop, Argonne National Laboratory, Lemont, IL, July 11-12, 2017.

7. *Performance Prediction Models for Large-Scale Interconnection Networks in HPC System*, presented at Graduate Student Appreciation Week (GSAW) scholarly forum 2017, Florida International University, Miami, FL, March 27-28, 2017.

8. *Contract-Based Emergency Demand Response Participation of Multi-tenant Colocation Data Center*, presented at Graduate Student Appreciation Week (GSAW) scholarly forum 2016, Florida International University, Miami, FL, March 28-29, 2016.

9. *A Contract Design Approach for Colocation Data Center Demand Response*, presented at IEEE/ACM International Conference on Computer-Aided Design (ICCAD 2015), Austin, TX, USA, November 2-6, 2015.

Professional Activities

- **Program committee member**
  - Winter Simulation Conference (**WSC 2019**)
  - ACM SIGSIM Conference on Principles of Advanced Discrete Simulation (**SIGSIM PADS 2019**)
  - International Conference on Computing, Networking and Communications (**ICNC 2016, 2017, 2018, 2019**)
  - International Workshop on Applied Modeling and Simulation (**WAMS 2019**)
  - IEEE International Conference on Communications (**ICC 2018**)
- **Journal reviewer**
  - Elsevier **SoftwareX**
  - ACM Transactions on Modeling and Computer Simulation (**TOMACS**)
  - IEEE Transactions on Big Data (**TBD**)
  - IEEE Transactions on Cloud Computing (**TCC**)
  - IEICE Transactions on Information and Systems (**ISS**)
- **Reviewer**
  - IEEE International Conference on Cloud Computing (**Cloud 2015**)
- **Sub-reviewer**
  - ACM SIGSIM Conference on Principles of Advanced Discrete Simulation (**ACM SIGSIMPADS 2016**)
  - IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (**IEEE MASCOTS 2019**)
- **Member** of ACM, 2017-2018
- **Member** of SIGSIM, Since 2017-2018

Skills

Programming Languages: Python, C/C++, Java, PL/SQL, HTML, JavaScript, Shell
Programming Environments: Vim, Matlab, NetBeans, Eclipse, Microsoft Visual Studio, Oracle, MySQL
Other Tools/ Softwares: MPI, OpenMP, Git, SVN, LaTeX, PacketTracer, Network Simulator-2
Operating Systems: Linux, Microsoft Windows family, Apple OS X

Selected Software Projects

Demand-response models for HPC systems **January 2017 - April 2018**

- Proposed and developed algorithms for HPC systems' participation in demand response and reduce energy consumption.
- Published at premier conference venues, such as IEEE MASCOTS, IEEE HPCC, etc.

Job scheduler simulator **January 2017 - April 2018**

- Developed a simulator for HPC jobs' scheduling and resource allocation, to demonstrate effectiveness of proposed HPC system's demand response participation.

Performance prediction toolkit (PPT) **August 2015 - December 2016**

- Developed the interconnection network models for accurate, scalable, and efficient performance prediction of large-scale scientific applications in high-performance computing architectures (`https://github.com/lanl/PPT`).
- Published at premier conference venues, such as ACM SIGSIM PADS, IEEE HPCC, etc.

Sustainable computing for cyber-physical systems **May 2013 - July 2015**

- Developed novel algorithms to enable sustainable computing through reduction of energy consumption, carbon emission, etc. for cyber-physical systems.
- Published at top conference and journal venues, such as IEEE/ACM ICCAD, USENIX ICAC, IEEE Transactions of Cloud Computing, etc.

Java program instrumentation **August 2014 - November 2014**

- A dynamic analyzer to detect concurrency bugs of multi-threaded programs. Apache Commons Byte Code Engineering Library (BCEL) was used to detect bugs by looking at the footprints of execution.

Hot topics detection in Twitter **January 2014 - April 2014**

- A project for finding hot topics and related active users in Twitter. Used MySQL to store the Tweets and the authors, identified trending topics in Twitter, and produced the topics and related authors on map using Apache Tomcat, JavaServer Pages, Highcharts.

Collaboration and Supervision Skills

- Collaborated with group of skilled research scientists and software developers from Los Alamos National Laboratory, NM and Argonne National Laboratory, Lemont, IL.
- Supervised an REU (Research Experience for Undergraduate) student during Summer 2013, which resulted in an article being published at an IEEE conference.